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ABSTRACT

This study investigates plural noun forms in Modern Hebrew to show that the pattern of regularization differs for specific words, rather than for classes of words. Early regularization, in which the children add a plural suffix with no stem change, applies unconditionally. Subsequently, the pattern changes and while some words are still regularized by six year olds, others are given the correct plural form by grade-school age children. Other words continue to deviate from the norms of classical Hebrew, even in the speech of educated adults. A test was administered to 48 native Hebrew speakers of high socio-economic status, 12 each at the ages of three, six, and twelve, and non language-major college students. The 20 items tested plural formation for two classes of feminine nouns and two classes of masculine nouns. Results reveal the complex interaction between formal linguistic knowledge and incidental knowledge due to familiarity of specific forms in language usage and in formulaic contexts. Both kinds of knowledge are developmentally determined, yet some historically deviant forms have entered standard usage. What constitutes an error may need to be evaluated differentially with respect to the language of young children compared with that of older speakers.
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CHILDREN'S REGULARIZATIONS OF PLURAL FORMS*

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Children's regularizations of linguistic forms have been the source of rich insights into language acquisition processes. Research dating from the sixties has shown that errors such as mans or swimmed are evidence that the child has internalized a general rule, while lacking knowledge about specific lexical items.

Our study investigates a subset of plural noun forms in Modern Hebrew, to show that the pattern of regularization differs for specific words, rather than for classes of words. Early regularization applies "across the board": Children merely add a plural suffix with no change in stem. Subsequently, a differential pattern emerges: Some words are still regularized by six-year olds, while others are given the correct plural form by grade-school age children; and yet other plural words continue to deviate from the norms of classical Hebrew even in the speech of educated adults.

We are thus led to consider the relation between child language and language change, and why some errors are fossilized, whereas others are corrected between preschool age and adolescence. The answer lies partly in the relative complexity of various alternations, on the assumption that children will acquire simpler alternations first, and that more complex alternations may be developmentally deferred, or never acquired at all (Clark 1980, Slobin 1977). However, "formal-space" problems (in the sense of Karmiloff-Smith 1979) interlock in complicated ways with extrinsic factors of frequency in current usage and the familiarity of set forms. And the formal study of "grammar" at school also plays a role in speakers' perceptions of rules and of correctness (Berman 1981).

This study was motivated by two sets of observations. Hebrew plurals are formed by adding the suffix -im to masculine nouns and adjectives, as in kadur / kadurim 'ball/s', tov / tovim 'good', and with the suffix -ot in feminine words, as in mita / mitot 'bed/s', tova / tovot 'good+Fem'. This system is acquired in essence as part of early morpho-syntactic development between ages two to three (Kaplan, in progress), and is one of the few areas that has been well studied for Hebrew child language (Levy 1980). The first observation which led me to inquire further into plural formation was the variability of my daughter's use of the word for 'dress', as shown in (1) below, where arrows indicate persistence of a form over time.

(1) One child's forms of the word simla 'dress', aged 2 - 4:

"Stage"	Singular	Plural
1	simla	--
2	↓	*simlot (regularized)
3		smalot (corrected to norm)
4	*smala (backformation)	↓
5	simla	

When the child first used the word in the plural, she regularised it by using the correct feminine suffix -ot without changing the stem. This conforms with the findings of Levy (1980), whose subjects aged 2;2 to 2;11 avoided modifying stems in producing plural forms. And it can be explained by Clark's (1980) Principle of Simplicity, that "the less a word-form changes, the simpler it is", and by two of Slobin's (1980) operating principles: to "identify formal patterns in your language" and to "pick one form of a word as basic and use this as the root for grammatical alternations". By around the middle of her fourth year ("Stage 3" above), the child did produce the normative form smal-ot with the required stem-change, the form becoming strong enough to be the basis for a short-lived backformation in the singular ("Stage 4"). This was soon replaced by the normative singular simla, so that by age four the child had the correct alternation simla / smalot for this word.

However, the child did not at this stage form the plural correctly for other words she knew that required the same formal alternation, as shown in the words under Class B of (2) below:

(2) Feminine Nouns with Singular PiCCa and CiCCa:
[P = Prefixal, C = Root Consonant]

CLASS A: PiCCa → PiCC-ot

e.g. tikra / tikrot 'ceiling/s' - Root q-r-y
micva / micvot 'good deed/s' - Root c-w-y

CLASS B: CiCCa → CCaC-ot

e.g. ricpa / rcaf-ot 'floor/s' - Root r-c-p
mišxa / mšax-ot 'paste/s' - Root m-š-x

Words like these underlie the second observation which motivated this study. There are two classes of feminine nouns in Hebrew with the same surface consonant plus vowel pattern as simla 'dress': Those in A take a regular plural ending with no stem-change, those in B incur a change in stem-vowels in the plural. Speakers have no difficulty forming the plural of Class A nouns, but even high-school students regularize some Class B words in the plural (Donag-Kinrot 1978). Yet they regularize only some of these words, not others, with no apparent formal motivation, either phonetic or semantic. The occurrence of the plural of mišxa 'paste' as *mišxot rather

than normative mšaxot can, however, hardly be considered an "error" if educated native speakers fail to perceive it as such. Moreover, there are over 100 quite common words of Class B in Hebrew, but scarcely a dozen, mainly rare or archaic, words of Class A type (as listed in Barkali 1964 and Even-Shoshan 1968). Hence "applicability" in the sense of MacWhinney (1980), or the extent to which a given alternation happens to apply across the lexicon, does not seem relevant to speakers' construals of these forms. Note, finally, that the words in A and B of (2) above are etymologically distinct, for the A words, with no stem-change in the plural, consist of a prefixal and two root consonants, while those in B include three "full" or root consonants, and are typically derived from semantically related verbs with the same root (e.g. ricpa 'floor' / le-racef 'to tile'). Yet none of the Israeli colleagues that I asked, except for Hebrew Language specialists, was aware of this fact. Hence this difference has no psychological reality for current speakers, and the different plural forms for Class A and B nouns respectively is an arbitrary accident as far as they are concerned.

Against this background, I examined how children treat the plurals of words in the two superficially identical but historically distinct classes shown in (2). In order to make the study more general, I added a set of masculine words like those shown in (3):

(3) Masculine Nouns/Adjectives with Surface Singular CaCaC:

CLASS C: CaCaC → CaCaC-im

e.g. gamad / gamad-im 'dwarf/s' tabax / tabax-im 'cook/s'
panas / panas-im 'torch/es' cayar / cayar-im 'painter/s'

CLASS D: CaCaC → CCaC-im

e.g. gamal / gmal-im 'camel/s' katan / ktan-im 'small'
marak / mrak-im 'soup/s' yakar / ykar-im 'dear'

This set of forms corresponds to the feminine forms in (2) as follows: A superficially identical singular form either has no stem-change in the plural (Class C) or it incurs stem-initial vowel reduction before the plural suffix -im (Class D). Again, the distinction is historically motivated, as Class C nouns were formerly pronounced with a geminate medial consonant blocking vowel reduction in the plural, whereas Class D nouns have a stem-initial open syllable. But these distinctions are not realized in current Israeli pronunciation.

I tested plural formation for these four sets of nouns - two classes of feminine nouns and two classes of masculine nouns. My hypotheses were, firstly, that young preschool children will tend to regularize across the board, adding -ot to feminine and -im to masculine words with no stem change. Older children will adjust the stem correctly for some but not all nouns, with correction to adult norms increasing with age. Adults will manifest "pattern-recognition" and make the required stem-change in all but a few words, with respect to which general language change can be predicted. Secondly,

I assumed that the specific choice of words that are corrected or remain regularized will not correspond to any clear semantic or phonetic class, but will be distributed in an apparently haphazard fashion across the lexicon.

A test was given to 48 native Hebrew speakers of high SES background, 12 each at the ages of three, six (first graders), twelve (Grade VI-VII), and nonlanguage-major college students. The 20 test-items were distributed as follows:

(4) Control A - CiCCa feminine nouns, no stem-change - 2 words
Test B - CiCCa feminine nouns, plural CCaC-ot - 6 words
Control C - CaCaC masculine nouns, no stem-change- 3 words
Test D - CaCaC masculine words, plural CC-im - {6 nouns / 3 adjs}

Test items were chosen for being everyday words likely to be familiar to three-year olds. Additional items were added to each of the two test groups B and D for the twelve-year olds and adults, in the form of less concrete words which the younger subjects would not know. Items were presented in randomized order. The three-year olds were first given warm-up items to check that they knew how to form plurals in general, and only children who could do so were included in the test. Pictures were used with the three-year olds, while all other subjects were simply asked to give the plural form.

Results on the 5 control items (Types A and C) are shown below:

Table 1 - Results on control items (no change in stem)
[5 items x 12 Ss = 60 responses for each age]

RESPONSE-TYPE	3-years	6-years	12-years	adults
Correct	52(87%)	52(87%)	58(97%)	57(95%)
Masc.for fem.	1	5	1	--
Singular	6	--	--	--
Hypercorrect	--	2	1	3
Other	1	1	--	--

There were very few errors in forming plurals with no change in stem. One adult hypercorrected tikra 'ceiling' to *tkar-ot and 2 adults and 3 older children changed tavas 'peacock' to form *tvas-im. The six-year olds gave the feminine noun tipša 'fool' the masculine plural tipšim in 5 out of 12 instances, treating it as a kind of neuter, as discussed below. (In fact, this noun is not even a member of the morphological Class A as is tikra 'ceiling', but there was not a single other word in this class which young children are likely to know!) The youngest subjects made in all 9 errors out of a possible 60 responses - either no response, repetition of the singular-form stimulus item, or a paraphrase such as ylad-im 'boys' in place of gamad-im 'dwarfs'. This confirms that by around age

three, Hebrew-speaking children can correctly form the plural of both masculine and feminine nouns which require no change in stem.

Very different findings emerge for the test items, where sharp differences were found according to age and to specific item. Below, "regularized" indicates a plural formed with no change in stem.

Table 2 - Results on Class D masculine nouns and adjectives

RESPONSE-TYPE	3-years	6-years	12-years	adults
(i) [6 nouns x 12 Ss = 72 responses for each age]				
Correct	11 (15%)	53 (74%)	71 (98%)	72 (100%)
Regularized	48 (67%)	18 (25%)	1	--
Other	13 (18%)	1	--	--
(ii) [3 adjectives X 12 Ss = 36 responses for each age]				
Correct	21 (58%)	32 (89%)	36 (100%)	36 (100%)
Correct + Fem.	1	4 (11%)	--	--
Regularized	8 (22%)	--	--	--
Other	6 (17%)	--	--	--

The 12-year olds and adults know the plural forms of all the test nouns and adjectives requring vowel reduction before the plural suffix, e.g. šafan / šfan-im 'rabbit/s', kacar / kcar-im 'short'. The 6-year olds do conspicuously better than the youngest subjects, who form the plural of such nouns in two-thirds of the cases by simply adding -im to the singular stem (e.g. *šafan-im 'rabbits'). There is a clear difference between nouns and adjectives: 6-year olds pluralize adjectives correctly in nearly all cases, the 3-year olds over half the time. Before we try to interpret these findings, consider the results for the most complex items - feminine nouns requiring stem-change.

Table 3 - Results on Class B feminine nouns with stem change
[6 nouns X 12 Ss = 72 responses for each age]

RESPONSE-TYPE	3-years	6-years	12-years	adults
Correct	--	12 (17%)	35 (48%)	42 (58%)
Correct + Masc.	--	2 (3%)	8 (12%)	11 (15%)
Regularized	63 (88%)	54 (75%)	29 (40%)	19 (26%)
Other	9 (12%)	--	--	--

Again, the major response strategy of the 3-year olds is to regularize by adding the -ot feminine ending with no stem-change, as in simla / *siml-ot 'dress/es'. Other immature responses are simple repetition of the singular stimulus, or no answer. By contrast with the masculine items in Table 2, 6-year olds still tend to regularize these feminine nouns in most cases, while correct responses (including a masculine -im ending) are given by less than half the 12-year olds and only slightly over half the adults.

In discussing these results, consider first what in fact can be taken as an "error" in the language usage of children and of adults (as re-evaluated in Ochs 1981). Two kinds of errors appeared which we had not predicted. The youngest subjects sometimes gave a different, though semantically cognate word in response - e.g. gamadim 'dwarfs' was replaced by yladim 'children', and kcarim 'short' was replaced by ktanim 'small'. The attempt to use other, related words in place of unfamiliar test items seems to be a quite common strategy of children who are still unable to relate consistently to the formal parameters of the test task, as is shown by the "suppletive responses" noted by Clark & Hecht (to appear), as well as by findings for Hebrew-speaking children on various different tasks in research in progress by Dorit Ravid and by Rachel Yifat.

A second unexpected error was use of the masculine plural form tipšim for feminine tipša 'girl-fool' (Class A) by nearly half of the six-year olds, and masculine kvasim 'lambs' for feminine kivsa 'she-lamb' (Class B) given increasingly with age - by 3 of the 6-year olds, 8 of the adolescents, and 11 out of the 12 adults. This is consistent with the findings of Levy (1980), whose adult subjects sometimes gave masculine rather than feminine plurals for nouns, and it indicates that for people and animals (fools and lambs), masculine plural is taken as the "neuter" collective form.

More difficult is the question of what an error is with regard to the figures in Table 3. The tendency to regularize by adding the correct feminine plural with no stem-change is clearly age-bound, and accounts for nearly 90% of 3-year old responses and 75% of 6-year old responses, as against 40% and 26% among adolescents and adults respectively. But given that the latter are well-educated native speakers, their usage can hardly be counted as "wrong". Rather, their deviations from the historically determined textbook norm which requires stem-change for all Class B nouns (simla/smal-ot) must be taken to indicate general language-change, where such regularized forms as mišxot 'creams' (cf. normative mšax-ot) or pitmot 'nipples' (cf. ptam-ot) have been absorbed into a new kind of "standard Hebrew".

Yet such regularizations do not apply across the board for any set of test-items nor for any group of subjects. Our first hypothesis, that the plural ending with no stem change would be added by the youngest subjects,is borne out to a very large extent by their results in Table (3) for the feminine nouns, and by the fact that they regularized the masculine nouns in Table (2) nearly 70% of the time. But even the three-year olds gave nearly 60% correct responses for the adjectives - lavan/lvanim 'white', katan/ktanim 'small', and kacar/kcarim 'short'. One might argue that by this young age, children have internalized some formal notion of adjectives as a distinct class of words. A more feasible explanation for the early tendency to form adjective plurals correctly is their wide range of "applicability", for children apply plural adjectives meaning 'little' or 'white' to numerous entities, whereas they might never have had occasion to use

the test-nouns in their plural form. Two kinds of evidence indicate that this explanation is correct. Firstly, when a few additional children aged around three were asked for the plural of both the test adjectives and the less familiar word yakar 'dear = precious, expensive', they tended to give the correct answer for the first three adjectives but to regularize the required ykar-im to *yakar-im. Consider, secondly, the few cases where three-year olds gave a correct plural for a noun from those taking the same CaCaC/CCaC-im alternation as these adjectives. Of the 11 correct answers that 3-year olds gave for the 6 nouns in this set, 6 were for the word dvarim 'things' and 3 for the word šfanim 'rabbits', both words which are familiar to preschoolers in their plural form - where familiarity was evaluated by ranking of six nursery and first-grade teachers for the test items in both singular and plural with respect to the children that they teach. Several children, in fact, did not seem to recognize the singular davar 'thing', but gave the correct plural form when prompted by the formulaic context of kol miney ... 'all kinds-of ...'.

The factor of "familiarity" is crucial for explaining seeming discrepancies in our results. As we had hypothesized, the distinction between developmental errors which are corrected at grade-school age and those fossilized in adolescent and adult usage does not correlate with either phonetic or semantic properties - with the exception of adjectives, as noted above. Rather, by age six there was not a single regularization of the two nouns ranked highest for familiarity in the plural - davar 'thing' and šafan 'rabbit' - whereas around half the six-year olds did regularize nouns in this class which are more familiar in the unmarked singular - bacal 'onion' (usually a mass-noun in Hebrew), zakan 'beard', safam 'moustache'. The feminine nouns of Class B yield an even more complex picture, as shown in Table (4) below. Only the older subjects are included here, since the three-year olds regularized these words across the board, as shown in Table (3), even though the six items here included such familiar words as simla 'dress' and mišxa 'paste, cream' (for putting on cuts and sores).

Table 4 - Normative CCaC-ot vs. regularized CiCC-ot plurals

TEST-WORD	6-year olds		12-year olds		Adults	
	Norm.	Reg.	Norm.	Reg.	Norm.	Reg.
simla 'dress'	8	4	12	--	11	--
giv'a 'hill'	2	10	9	3	12	--
ricpa 'floor'	--	12	8	4	9	3
pitma 'nipple'	--	10	4	8	5	7
mišxa 'paste'	--	10	--	12	4	8
kivsa 'lamb'	--	9	2	2	1	--
masc. kvasim	--	--	8		11	

Six-year olds have mostly acquired the plural smalot 'dresses' by rote, as though a special kind of "irregular" form (and see my child's use of this word in (1) above). Elsewhere, they regularize these plurals like younger children. The 12-year olds make no errors with smalot, and they make fewer errors in the words for 'hills' and 'floors' than 'nipples' or 'pastes' - much the same as the adults. We hold that the crucial factor determing which plural applies in each case is familiarity with a given form qua form, not merely the word as a lexeme. Six-year olds may know the word for 'floor' very well, but be less familiar with it in the plural. That is, the notion of "familiarity" and how it interrelates with the "haphazard examples" (Carey 1978) which speakers encounter at different points in their experience is not simply a function of exposure to the actual referents in real-life situations; it is closely linked to language use and to linguistic context, in the following sense.

Firstly, the plural is the unmarked form of usage with certain nouns, for largely pragmatic reasons. We noted this for the word dvarim 'things' with young children; and we tested this for the two older groups by adding several words typically occurring in the plural in adult Hebrew - e.g. sfarot 'numerals', klayot 'kidneys', šmašot 'windshields'. Subjects rarely made errors with these forms, but they did sometimes query the singular kilya 'kidney' and šimša 'windshield', since they tend to render these as non-normative *klaya, *šmaša by backformation from the plural! Similarly, six-year olds may call a tear (from the eyes) *dma'a deriving from the more familiar plural dma'ot 'tears' rather than normative dim'a. Secondly, plural forms sometimes occur in set formulas (Peters 1980). Thus, all the older subjects gave the normative plural for simxa 'happy occasion', known from the formulaic le hitra'ot bi smaxot 'let's meet on happy occasions', and also for kirya 'township', known from the set form ha krayot referring to a group of townships near the city of Haifa. The fact that most adults regularized the plural of mišxa 'paste', and some even the plural of ricpa 'floor' may be because these are familiar to them in the bound form of set noun compounds, such as mišxot šinayim 'toothpastes' or ricpot biton 'concrete floors'.

How, then, do children acquire knowledge of plural forms that require a change in stem? Not through any formal perception of one class of nouns as distinct from another - Class A vs. B, Class C vs. D - for they have no phonetic cues to assist them in this. Rather, children come to approximate adult use, including of words which have remained regularized, as a result of their experience - which entails not only increased contact with real-world entities, but also greater familiarity with specific linguistic contexts of a given form.

Another question arising from the results concerns the far better performance on masculine Class D words such as bacal / bcal-im 'onion' than on feminine Class B nouns like simla / sml-ot 'dress', shown by all subjects from age six up. One reason is the relative formal simplicity of the first group: Stem-vowel reduction as in zakan /

zkan-im 'beard/s' distorts the stem far less than vowel alternation as in pitma / ptam-ot 'nipple/s'. (After hearing a few of her classmates do the test, my six-year old informed me that the plural of pitma was not pitmot, as they said, but patmot!) "Simplicity" here is not of the final output form, but of the alternation involved. For instance, the Class D masculine plural CCaC-im also occurs "simply" in prat / prat-im 'detail/s' and "complexly" in words with penultimate stem stress like pésel / psal-im 'statue/s'; and the feminine plural CCaC-ot alternates simply in nšama / nšam-ot 'soul/s' and complexly in yalda / ylad-ot 'girl/s'. And the alternation of Class B feminine nouns is sometimes made even more opaque by spirantization of a root-medial stop - as in ricpa vs. rcaf-ot 'floors', liška vs. lšax-ot 'offices - an alternation which is not incurred in masculine Class D nouns like safam 'moustache', davar 'thing', with a medial spirant in both singular and plural. Besides, reduction of a stem-penultimate vowel before a stressed suffix is a general process in Hebrew nouns and adjectives - e.g. pakid / pkid-im 'clerks', šalom / šlom-o 'his peace', gadol / gdol-a 'big+Fem.' Thus Class D alternations are phonologically simpler, hence easier to acquire, than those of Class B feminine nouns.

There is also a semantic basis to the relative ease of older children and adults in forming the plural of Class D nouns like gamal / gmal-im 'camel/s'. The Class C nouns with no stem-change like gamad / gamad-im 'dwarf/s' (a word known to first-graders from the Hebrew for "Snow White and the Seven Dwarfs") are very productively used in Hebrew to specify agent nouns, such as tabax 'cook', cayar 'painter', ganav 'thief', tayas 'pilot' and many, many more. By the end of grade-school, Hebrew speakers evidently have an idea that nouns like these, with no vowel reduction in the plural, fall into a coherent semantic class of agent nouns. This is shown by the fact that 4 of the older subjects "corrected" the plural for 'peacock' to give *tvas-im in place of tavas-im, and all of the 12-year olds and adults gave vowel-reduced plurals for inanimate nouns like marak 'soup', pagaz 'mortar'. Thus, while three-year olds take the stem-form CaCaC as the basis for all plurals without concern for formal class, by the end of grade-school, speakers are aware that this is confined to the semantic class of human agent-nouns. For young children, then, CaCaC+suffix is the norm, with a few rote-learned exceptions; for older speakers, vowel-reduced CCaC+suffix is the norm, with some semantically well-defined exceptions.

Plural formation in two sets of Hebrew nouns has been used to demonstrate the complex interaction between formal linguistic knowledge (of stem-vowel reduction, or the semantics of agent nouns) and incidental knowledge due to familiarity of specific forms in language usage and in formulaic contexts. Both kinds of knowledge are developmentally determined, yet there are instances where historically deviant forms have entered standard usage. This indicates that what constitutes an "error" may need to be evaluated differentially with respect to the language of young children compared with that of older speakers.

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